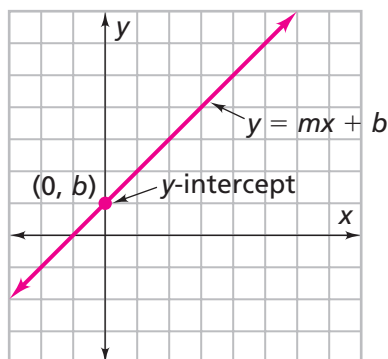


2.3 Comparing Costs

In the last problem, you found the point at which Emile's and Henri's graphs cross the y -axis. These points are called the *y-intercepts*.

- The distance d_{Emile} that Emile walks after t seconds can be represented by the equation, $d_{\text{Emile}} = 2.5t$. The y -intercept is $(0, 0)$ and the *coefficient* of t is 2.5.
- The distance d_{Henri} that Henri is from where Emile started can be given by the equation, $d_{\text{Henri}} = 45 + t$, where t is the time in seconds. The y -intercept is $(0, 45)$ and the *coefficient* of t is 1.

All of the linear equations we have studied so far can be written in the form $y = mx + b$ or $y = b + mx$. In this equation, y depends on x .



The **y-intercept** is the point where the line crosses the y -axis, or when $x = 0$. To save time, we sometimes refer to the number b , rather than the coordinates of the point $(0, b)$, as the y -intercept.

A **coefficient** is the number that multiplies a variable in an equation. The m in $y = mx + b$ is the coefficient of x , so mx means m times x .

Problem 2.3 Comparing Equations

Ms. Chang's class decides to give T-shirts to each person who participates in the Walkathon. They receive bids for the cost of the T-shirts from two different companies. Mighty Tee charges \$49 plus \$1 per T-shirt. No-Shrink Tee charges \$4.50 per T-shirt. Ms. Chang writes the following equations to represent the relationship between cost and the number of T-shirts:

$$C_{\text{Mighty}} = 49 + n$$

$$C_{\text{No-Shrink}} = 4.5n$$

The number of T-shirts is n . C_{Mighty} is the cost in dollars for Mighty Tee and $C_{\text{No-Shrink}}$ is the cost in dollars for No-Shrink Tee.

- A.**
1. For each equation, explain what information the y -intercept and the coefficient of n represents.
 2. For each company, what is the cost for 20 T-shirts?
 3. Lani calculates that the school has about \$120 to spend on T-shirts. From which company will \$120 buy the most T-shirts?
 4. **a.** For what number of T-shirts is the cost of the two companies equal? What is that cost? Explain how you found the answers.
b. How can this information be used to decide which plan to choose?
 5. Explain why the relationship between the cost and the number of T-shirts for each company is a linear relationship.



B. The table at the right represents the costs from another company, The Big T.

1. Compare the costs for this company with the costs for the two companies in Question A.
2. Does this plan represent a linear relationship? Explain.
3. **a.** Could the point (20, 84) lie on the graph of this cost plan? Explain.
b. What information about the number of T-shirts and cost do the coordinates of the point (20, 84) represent?

T-Shirt Costs

n	C
0	34
3	41.5
5	46.5
8	54
10	59

ACE Homework starts on page 31.

2.4 Connecting Tables, Graphs, and Equations

Look again at Alana's pledge plan from Problem 1.3. Suppose A represents the dollars owed and d represents the number of kilometers walked. You can express this plan with the equation below:

$$\text{Alana's pledge plan: } A = 5 + 0.5d$$

Getting Ready for Problem 2.4

- Explain why the point (14, 12) is on the graph of Alana's pledge plan.
- Write a question you could answer by locating this point.
- How can you use the equation for Alana's pledge plan to check the answer to the question you made up?
- How can you use a graph to find the number of kilometers that Alana walks if a sponsor pays her \$17? How could you use an equation to answer this question?

Alana's Pledge Plan

